Claims

[c1]

1. A method for correcting segments errors on a network comprising:

A. building a data segment which comprises a data segment length field used to calculate when to send an acknowledgement segment and a data segment error detection mechanism used to detect errors within said data segment;

B. sending said data segment on a time division multiplexed data transfer mechanism from a sending network node wherein said data segment develops one or more errors as it is sent across said time division multiplexed data transfer mechanism;

C. receiving said data segment on said time division multiplexed data transfer mechanism sent from said sending network node at a receiving network node;

D. detecting said one or more errors within said data segment using said data segment error detection mechanism on said receiving network node;

E .sending a failure indication from said receiving network node by failing to respond with said acknowledgement segment at the correct time;

F. detecting said failure to respond by said receiving network node on said sending network node; and

G. resending said data segment from said sending network node on said time division multiplexed data transfer mechanism.

[c2]

2. A method for correcting segment errors on a network as recited in claim 1, wherein sending said data segment on said time division multiplexed data transfer mechanism further comprises sending said data segment on a network selected from the group consisting of a wireless network, a light frequency network, a power line network, and a wired network.

[c3]

3. A method for correcting segment errors on a network as recited in claim 1, wherein building said data segment further comprises building said data segment by adding forward error correction to said data segment.

[c4]

4. A method for correcting segment errors on a network as recited in claim 3, wherein building said data segments by adding said forward error correction further comprises adding said forward error correction using a forward error correction mechanism selected from the group consisting of Hamming codes, Convolutional codes, Reed-Solomon codes, Low Density Parity Check Codes, Trellis codes, Block Turbo codes and Walsh codes.

[c5]

5. A method for correcting segment errors on a network as recited in claim 1, wherein building of said data segments further comprises building said data segments with said data segment error detection mechanism selected from the group consisting of a cyclic redundancy check, a checksum, and parity.

[c6]

6. A method for correcting segment errors on a network as recited in claim 1, wherein resending said data segments further comprises resending said data segments based on a resend value.

[c7]

7. A method for detecting lost segments on a network comprising:

A. building a data segment which comprises a data segment length field used to calculate when to send a negative acknowledgement segment and a data segment error detection mechanism used to detect errors within said data segment;

B. sending said data segment on a time division multiplexed data transfer mechanism from a sending network node;

C. receiving said data segment on said time division multiplexed data transfer mechanism sent from said sending network node at a receiving network node;

D. sending a said negative acknowledgement segment on said time division multiplexed data transfer mechanism from said receiving network node based on said data segment length field;

E. receiving said negative acknowledgement segment on said time division multiplexed data transfer mechanism on said sending network node; and

F. resending said data segment on said from said sending network node on said time division multiplexed data transfer mechanism.

[c8]

8. A method for detecting lost segments on a network as recited in claim 7, wherein sending said data segment on said time division multiplexed data transfer mechanism further comprises sending said data segment on a network selected from the group consisting of a wireless network, a light frequency network, a power line network, and a wired network.

[c9]

9. A method for detecting lost segments on a network as recited in claim 7, wherein building said data segment further comprises building said data segment by adding forward error correction to said data segment.

[c10]

10. A method for detecting lost segments on a network as recited in claim 9, wherein building said data segments by adding said forward error correction further comprises

adding said forward error correction using a forward error correction mechanism selected from the group consisting of Hamming codes, Convolutional codes, Reed-Solomon codes, Low Density Parity Check Codes, Trellis codes, Block Turbo codes and Walsh codes.

[c11]

11. A method for detecting lost segments on a network as recited in claim 7, wherein building of said data segments further comprises building said data segments with said data segment error detection mechanism selected from the group consisting of a cyclic redundancy check, a checksum, and parity.

[c12]

12. A method for detecting lost segments on a network as recited in claim 7, wherein resending said data segments further comprises resending said data segments based on a resend value.

[c13]

13. A method for detecting lost segments on a network as recited in claim 7, wherein sending of said negative acknowledgement segment further comprises sending said negative acknowledgement segment with a status that indicates an error selected from

the group consisting of a out of receive buffer reject, a cipher reject, an out of sequence reject, and a unsupported version error.

[c14]

14. A method for validating segments on a network comprising:

A. building a data segment which comprises a data segment length field used to calculate when to send a positive acknowledgement segment and a data segment error detection mechanism used to detect errors within said data segment;

B. sending said data segment on a time division multiplexed data transfer mechanism from a sending network node;

C. receiving said data segment on said time division multiplexed data transfer mechanism sent from said sending network node at a receiving network node;

D. validating said data segment on said receiving network node by using said data segment error detection mechanism; and

E. sending said positive acknowledgement segment on said time division multiplexed data transfer mechanism from said receiving network node based on said data segment length field.

[c15]

15. A method for validating segments on a network as recited in claim 14, wherein sending said data segment on said time division multiplexed data transfer mechanism further comprises sending said data segment on a network selected from the group consisting of a wireless network, a light frequency network, a power line network, and a wired network.

[c16]

16. A method for validating segments on a network as recited in claim 14, wherein building said data segment further comprises building said data segment by adding forward error correction to said data segment.

[c17]

17. A method for detecting lost segments on a network as recited in claim 16, wherein building said data segment by adding said forward error correction further comprises adding said forward error correction using a forward error correction mechanism selected from the group consisting of Hamming codes, Convolutional codes, Reed-

Solomon codes, Low Density Parity Check Codes, Trellis codes, Block Turbo codes and Walsh codes.

[c18]

18. A method for detecting lost segments on a network as recited in claim 14, wherein building of said data segments further comprises building said data segments with said data segment error detection mechanism selected from the group consisting of a cyclic redundancy check, a checksum, and parity.

[c19]

19. A method for validating segments on a network comprising:

A. building a data segment which comprises a data segment length field used to calculate when to send a positive acknowledgement segment and a data segment error detection mechanism used to detect errors within said data segment;

B. sending said data segment on a time division multiplexed data transfer mechanism from a sending network node;

C. receiving said data segment on said time division multiplexed data transfer mechanism sent from said sending network node at a receiving network node;

D. validating said data segment on said receiving network node by using said data segment error detection mechanism;

E. building said positive acknowledgement segment which comprises an acknowledgement segment error detection mechanism;

F. sending said positive acknowledgement segment on said time division multiplexed data transfer mechanism from said receiving network node based on said data segment length field wherein said positive acknowledgement segment develops one or more errors as it is sent across said time division multiplexed data transfer mechanism;

G. receiving said positive acknowledgement segment on said time division multiplexed data transfer mechanism on said sending network node;

H. detecting said one or more errors within said positive acknowledgement segment using said acknowledgement segment error detection mechanism on said sending network node; and

I. resending said data segment on said time division multiplexed data transfer mechanism from said sending network node.

[c20]

20. A method for validating segments on a network as recited in claim 19, further comprising the step of dropping duplicates of said data segment.

[c21]

21. A method for reliably sending segments on a network comprising:

A. building an active channel from time slots in a time division multiplexed network;

B. building a data segment; and

C. sending said data segment from a sending node on said active channel on said network multiple times based on a segment send value.

[c22]

22. A method for reliably sending segments on a network as recited in claim 21 wherein sending said data segment on said network further comprises sending said data segment on a network selected from the group consisting of a wireless network, a light frequency network, a power line network, and a wired network.

[c23]

23. A method for reliably sending segments on a network as recited in claim 21, wherein sending said data segment further comprises sending said data segment which is selected from the group consisting of a broadcast data segment, a uni-cast data segment, and a multi-cast data segment.

[c24]

24. A method for reliably receiving a segment on a network comprising:

A. building an active channel from time slots in a time division multiplexed network;

B. receiving a data segment one or more times on said active channel on said network; and

C. dropping duplicate data segments.

[c25]

25. A method for reliably receiving a segment on a network as recited in claim 24, wherein receiving said data segment on said network further comprises receiving said data segment on a network selected from the group consisting of a wireless network, a light frequency network, a power line network, and a wired network.

[c26]

26. A method for reliably receiving a segment on a network as recited in claim 24, wherein receiving said data segment further comprises receiving said data segment which is selected from the group consisting of a broadcast data segment, a uni-cast data segment, and a multi-cast data segment.

[c27]

27. A system for sending variable length segments and error detecting information on a network comprising:

A. a plurality of network nodes forming a network;

B. a time division multiplexed data transfer mechanism which is divided into a plurality of time slots for transfer of one or more data segments between said plurality of network nodes on said network;

C. wherein said plurality of network nodes further comprises a sending network node; and

D. wherein said sending network node further comprises a dynamic error detection encoder which generates said one or more data segments.

[c28]

28. A system for sending variable length segments and error detecting information on a network as recited in claim 27, wherein said network is selected from the group consisting of a wireless network, a light frequency network, a power line network, and a wired network.

[c29]

29. A system for sending variable length segments and error detecting information on a network as recited in claim 27, wherein said dynamic error detection encoder generates a variable length error detecting field based on a preamble.

[c30]

30. A system for sending variable length segments and error detecting information on a network as recited in claim 27, wherein said dynamic error detection encoder encodes segments with an error detection mechanism selected from the group consisting of a cyclic redundancy check, a checksum, and parity.

[c31]

31. A system for sending variable length segments and error correcting information on a network as recited in claim 27, wherein said dynamic error detection encoder generates a preamble that is 40 bits in length.

[c32]

32. A system for sending variable length segments and error correcting information on a network as recited in claim 27, wherein said dynamic error detection encoder generates an error correcting field that is 10 bits in length.

[c33]

33. A system for sending variable length segments and error correcting information on a network as recited in claim 27, wherein said dynamic error detection encoder generates an error correcting field that is 30 bits in length.

[c34]

34. A system for sending variable length segments and error correcting information on a network as recited in claim 27, wherein said dynamic error detection encoder generates a preamble that indicates no error correcting field.

[c35]

35. A system for sending variable length segments and error correcting information on a network as recited in claim 27, wherein said dynamic error detection encoder generates a preamble based on said one or more segment's length.

[c36]

36. A system for sending variable length segments and error correcting information on a network as recited in claim 27, wherein said dynamic error detection encoder generates a preamble based a network condition.

[c37]

37. A system for sending variable length segments and error correcting information on a network as recited in claim 36 wherein said network condition is a condition selected from the group consisting of one or more cyclic redundancy check errors and one or more forward error correction errors.

[c38]

38. A system for sending segments using different forward error correction methods on a network comprising:

A. a plurality of network nodes forming a network;

B. a time division multiplexed data transfer mechanism which is divided into a plurality of time slots for transfer of one or more data segments between said plurality of network nodes on said network;

C. wherein said plurality of network nodes further comprises a sending network node; and

D. wherein said sending network node further comprises a dynamic forward error correction encoder which generates said one or more data segments.

[c39]

39. A system for sending segments using different forward error correction methods on a network as recited in claim 38, wherein said network is selected from the group consisting of a wireless network, a light frequency network, a power line network, and a wired network.

[c40]

40. A system for sending segments using different forward error correction methods on a network as recited in claim 38, wherein said dynamic forward error correction encoder generates a forward error correction field which size is based on a preamble.

[c41]

41. A system for sending segments using different forward error correction methods on a network as recited in claim 38, wherein said dynamic forward error correction encoder encodes a segment with a forward error correction mechanism selected from the group consisting of Hamming codes, Convolutional codes, Reed-Solomon codes, Low Density Parity Check Codes, Trellis codes, Block Turbo codes and Walsh codes.

[c42]

42. A system for sending segments using different forward error correction methods on a network as recited in claim 38, wherein said dynamic forward error correction encoder generates a preamble that is 40 bits in length.

[c43]

43. A system for sending segments using different forward error correction methods on a network as recited in claim 38, wherein said dynamic forward error correction encoder encodes segments with a 5/16 rate forward error correction code.

[c44]

44. A system for sending segments using different forward error correction methods on a network as recited in claim 38, wherein said dynamic forward error correction encoder generates a preamble that indicates no forward error correction.

[c45]

45. A system for sending segments using different forward error correction methods on a network as recited in claim 38, wherein said dynamic forward error detection encoder generates a preamble based on said one or more segment's length.

[c46]

46. A system for sending segments using different forward error correction methods on a network as recited in claim 38, wherein said dynamic forward error correction encoder generates a preamble based a network condition.

[c47]

47. A system for sending segments using different forward error correction methods on a network as recited in claim 46 wherein said network condition is selected from the group consisting of one or more cyclic redundancy check errors and one or more forward error correction errors.

[c48]

48. A system for receiving variable length segments and error detecting information on a network comprising:

A. a plurality of network nodes forming a network wherein said plurality of network nodes further comprises a receiving network node;

B. a time division multiplexed data transfer mechanism which is divided into a plurality of time slots for transfer of one or more data segments between said plurality of network nodes on said network; and

C. wherein said receiving network node further comprises a dynamic error detection decoder which decodes said one or more data segments.

[c49]

49. A system for receiving variable length segments and error detecting information on a network as recited in claim 48, wherein said network is selected from the group consisting of a wireless network, a light frequency network, a power line network, and a wired network.

[c50]

50. A system for receiving variable length segments and error detecting information on a network as recited in claim 48, wherein said dynamic error detection decoder decodes a variable length error detecting field based on a preamble.

[c51]

51. A system for receiving variable length segments and error detecting information on a network as recited in claim 48, wherein said dynamic error detection decoder decodes said one or more segment's length is based a preamble.

[c52]

52. A system for receiving variable length segments and error detecting information on a network as recited in claim 48, wherein said dynamic error detecting decoder detects errors by checking said one or more data segments with an error detection mechanism selected from the group consisting of a cyclic redundancy check, a checksum, and parity.

[c53]

53. A system for receiving variable length segments and error detecting information on a network as recited in claim 48, wherein said dynamic error detection decoder detects errors within said one or more segments.

[c54]

54. A system for receiving variable length segments and error detecting information on a network as recited in claim 48, wherein said dynamic error detection decoder detects a preamble that is 40 bits in length.

[c55]

55. A system for receiving variable length segments and error detecting information on a network as recited in claim 48, wherein said dynamic error detection decoder detects an error correcting field that is 10 bits in length.

[c56]

56. A system for receiving variable length segments and error detecting information on a network as recited in claim 48, wherein said dynamic error detection decoder detects an error correcting field that is 30 bits in length.

[c57]

57. A system for receiving variable length segments and error detecting information on a network as recited in claim 48, wherein said dynamic error detection decoder detects a preamble that indicates no error detection field.

[c58]

58. A system for receiving segments using different forward error correction methods on a network comprising:

A. a plurality of network nodes forming a network wherein said plurality of network nodes further comprises a receiving network node;

B. a time division multiplexed data transfer mechanism which is divided into a plurality of time slots for transfer of one or more data segments between said plurality of network nodes on said network; and

C. wherein said receiving network node further comprises a dynamic forward error detection decoder which decodes said one or more data segments.

[c59]

59. A system for receiving segments using different forward error correction methods on a network as recited in claim 58, wherein said network is selected from the group consisting of a wireless network, a light frequency network, a power line network, and a wired network.

[c60]

60. A system for receiving segments using different forward error correction methods on a network as recited in claim 58, wherein said dynamic forward error correction decoder decodes a forward error correction mechanism's size is based on a preamble.

[c61]

61. A system for receiving segments using different forward error correction methods on a network as recited in claim 58, wherein said dynamic forward error correction decoder decodes said one or more data segment's length based on a preamble.

[c62]

62. A system for receiving segments using different forward error correction methods on a network as recited in claim 58, wherein said dynamic forward error correction decoder decodes said data segments with a method selected from the group consisting of Hamming codes, Convolutional codes, Reed-Solomon codes, Low Density Parity Check Codes, Trellis codes, Block Turbo codes and Walsh codes.

[c63]

63. A system for receiving segments using different forward error correction methods on a network as recited in claim 58, wherein said dynamic forward error correction decoder is used to detect errors within said one or more data segments.

[c64]

64. A system for receiving segments using different forward error correction methods on a network as recited in claim 58, wherein said dynamic forward error correction decoder is used to correct errors within said one or more data segments.

[c65]

65. A system for receiving segments using different forward error correction methods on a network as recited in claim 58, wherein said dynamic forward error correction decoder decodes a preamble that is 40 bits in length.

[c66]

66. A system for receiving segments using different forward error correction methods on a network as recited in claim 58, wherein said dynamic forward error correction decoder decodes using a 5/16 rate forward error correction code.

[c67]

67. A system for receiving segments using different forward error correction methods on a network as recited in claim 58, wherein said dynamic forward error correction decoder detects a preamble which indicates no forward error correction.

[c68]

68. A system for transmitting converted data on a network comprising:

A. a plurality of network nodes forming a network;

B. wherein said plurality of network nodes further comprises a Bandwidth Master Control Node responsible for bandwidth allocation on said network;

C. a time division multiplexed data transfer mechanism which is divided into a plurality of time slots which are non-binary widths, and wherein one or more of said time slots are grouped together to form one or more active channels by said Bandwidth Master Control Node for transfer of data between said plurality of network nodes on said network;

D. wherein said plurality of network nodes further comprises a sending network node and a receiving network node; and

E. wherein said sending network node further comprises a transmit data converter that takes input data and converts its format to fit in said time slots.

[c69]

69. A system for transmitting converted data on a network as recited in claim 68, wherein said network is selected from the group consisting of a wireless network, a light frequency network, a power line network, and a wired network.

[c70]

70. A system transmitting converted data on a network as recited in claim 68, wherein said plurality of time slots are 10 bits wide.

[c71]

71. A system transmitting converted data on a network as recited in claim 68, wherein said transmitting data converter's input width is a power of 2.

[c72]

72. A system for receiving converted data on a network comprising:

A. a plurality of network nodes forming a network;

B. wherein said plurality of network nodes further comprises a Bandwidth Master Control Node responsible for bandwidth allocation on said network;

C. a time division multiplexed data transfer mechanism which is divided into a plurality of time slots which are non-binary widths, and wherein one or more of said time slots are grouped together to form one or more active channels by said Bandwidth Master Control Node for transfer of data between said plurality of network nodes on said network;

D. wherein said plurality of network nodes further comprises a sending network node and a receiving network node; and

E. wherein said receiving network node further comprises a receiving data converter that takes time slot data and converts it to output data.

[c73]

73. A system for receiving converted data on a network as recited in claim 72, wherein said network is selected from the group consisting of a wireless network, a light frequency network, a power line network, and a wired network.

[c74]

74. A system receiving converted data on a network as recited in claim 72, wherein said plurality of time slots are 10 bits wide.

[c75]

75. A system receiving converted data on a network as recited in claim 72, wherein said receiving data converter's output width is a power of 2.

[c76]

76. A method for sending and receiving segments on a network comprising:

A. building an active channel from one or more time slots in a time division multiplexed network;

B. breaking up an upper-layer packet into one or more data segments;

C. sending said one or more data segments from a sending network node on said active channel;

D. receiving said one or more data segments on said active channel on a receiving network node; and

E. rebuilding said upper layer packet from said one or more data segments.

[c77]

77. A method for sending and receiving segments on a network as recited in claim 76, wherein sending said one or more data segments further comprises sending said one or more data segments on said network which further comprises a network selected from the group consisting of a wireless network, a light frequency network, a power line network, and a wired network.

[c78]

78. A method for sending and receiving segments on a network as recited in claim 76, further comprising the step of building a data segment which contain fields selected from the group consisting of a MAC field, a last segment field, a socket field, a segment data length field, a version number, Forward Error Correction field, an encryption field, a segment number field, an ARQ field, a source network number field, a destination network number field, a segment number, a source node number, and a destination node number.

[c79]

79. A method for sending and receiving segments on a network as recited in claim 76, wherein breaking up an upper layer packet further comprises breaking up an upper layer packet which contains a protocol selected from the group consisting of Internet Protocol, User Datagram Protocol, Transmission Control Protocol, Integrated Services Digital Network, Hyper Text Markup Language, Secure Sockets Layer, X.10, Common Application Language, Simple Control Protocol, and LonTalk.

[c80]

80. A method for sending and receiving segments on a network as recited in claim 76, wherein sending said one or more data segments further comprises sending said one or more data segments in order.

[c81]

81. A method for sending and receiving segments on a network as recited in claim 76, wherein receiving said one or more data segments further comprises receiving said one or more data segments in order.

[c82]

82. A method for sending and receiving segments on a network as recited in claim 78, wherein receiving said one or more data segments further comprises receiving said one or more data segments out of order.

[c83]

83. A method for sending and receiving segments on a network as recited in claim 76, wherein sending of said one or more segments further comprises sending said one or more segments on said one or more of said time slots within said active channel.

[c84]

84. A method for sending and receiving segments on a network as recited in claim 76, wherein receiving of said one or more segments further comprises receiving said one or more segments on said one or more said time slots within said active channel.

[c85]

85. A method for sending and receiving segments on a network as recited in claim 76, further comprising the steps of:

A. detecting an error in said one or more data segments on said receiving network node;

B. informing said sending network node of said error; and

C. resending said one or more data segments from said sending network node.

[c86]

86. A method for sending and receiving segments on a network as recited in claim 76, further comprising the step of dropping duplicates of said one or more data segments if one or more duplicates are received on said receiving network node.

[c87]

87. A system for correcting segments errors on a network comprising:

A. a plurality of network nodes forming a network;

B. a time division multiplexed data transfer mechanism which is divided into a one or more time slots, and wherein said one or more time slots are grouped together to form an active channel for transfer of one or more data segments between said plurality of network nodes on said network;

C. wherein said plurality of network nodes further comprises a sending network node and a receiving network node;

D. wherein said sending network node sends said one or more data segments which further comprises a data segment length field which is used to determine when to send an acknowledgement segment and a data segment error detection mechanism and wherein said one or more data segments develops one or more errors as it is sent across said network;

E. wherein said data segment is received by said receiving network node and said one or more errors are detected using said data segment error detection mechanism;

F. wherein a failure indication is sent by failing to respond with an acknowledgement segment at the correct time; and

G. wherein said sending network node resends said one or more data segments.

[c88]

88. A system for correcting segment errors on a network as recited in claim 87, wherein said network is selected from the group consisting of a wireless network, a light frequency network, a power line network, and a wired network.

[c89]

89. A system for correcting segment errors on a network as recited in claim 87, wherein said one or more data segments contain forward error correction.

[c90]

90. A system for correcting segment errors on a network as recited in claim 89, wherein said forward error correction is selected from the group consisting of Hamming codes, Convolutional codes, Reed-Solomon codes, Low Density Parity Check Codes, Trellis codes, Block Turbo codes and Walsh codes.

[c91]

91. A system for correcting segment errors on a network as recited in claim 87, wherein said data segment error detection mechanism is selected from the group consisting of a cyclic redundancy check, a checksum, and parity.

[c92]

92. A system for correcting segment errors on a network as recited in claim 87, wherein said one or more data segments are resent based on a resend value.

[c93]

93. A system for detecting lost segments on a network comprising:

A. a plurality of network nodes forming a network;

B. a time division multiplexed data transfer mechanism which is divided into a one or more time slots, and wherein said one or more time slots are grouped together to form an active channel for transfer of one or more data segments between said plurality of network nodes on said network;

C. wherein said plurality of network nodes further comprises a sending network node and a receiving network node;

D. wherein said sending network node sends said one or more data segments which further comprises a data segment length field which is used to determine when to send a negative acknowledgement segment and a data segment error detection mechanism;

E. wherein when said one or more data segments are received by said receiving network node and wherein said data segment is negatively acknowledged by sending said negative acknowledgement segment based on said data segment length field; and

F. wherein said sending network node resends said one or more data segments.

[c94]

94. A system for detecting lost segments on a network as recited in claim 93, wherein said network is selected from the group consisting of a wireless network, a light frequency network, a power line network, and a wired network.

[c95]

95. A system for detecting lost segments on a network as recited in claim 93, wherein said one or more data segments contains forward error correction.

[c96]

96. A system for detecting lost segments on a network as recited in claim 95, wherein said forward error correction is selected from the group consisting of Hamming codes, Convolutional codes, Reed-Solomon codes, Low Density Parity Check Codes, Trellis codes, Block Turbo codes and Walsh codes.

[c97]

97. A system for detecting lost segments on a network as recited in claim 93, wherein said data segment error detection mechanism is selected from the group consisting of a cyclic redundancy check, a checksum, and parity.

[c98]

98. A system for detecting lost segments on a network as recited in claim 93, wherein said negative acknowledgement segment further comprises a protocol version field, an acknowledgement field, and a cyclic redundancy check field.

[c99]

99. A system for detecting lost segments on a network as recited in claim 93, wherein said one or more data segments are resent based on a resend value.

[c100]

100. A system for detecting lost segments on a network as recited in claim 93, wherein said negative acknowledgement segment further comprises an acknowledgement field which further comprises a value selected from the group consisting of a positive acknowledgement, a out of receive buffer reject, a cipher reject, an out of sequence reject, and an unsupported version error.

[c101]

101. A system for validating segments on a network comprising:

A. a plurality of network nodes forming a network;

B. a time division multiplexed data transfer mechanism which is divided into a one or more time slots, and wherein said one or more time slots are grouped together to form an active for transfer of one or more data segments between said plurality of network nodes on said network;

C. wherein said plurality of network nodes further comprises a sending network node and a receiving network node;

D. wherein said sending network node sends said one or more data segments which further comprises a data segment length field which is used to determine when to send a positive acknowledgement segment and a data segment error detection mechanism; and

E. wherein when said one or more data segments are received by said receiving network node and said one or more data segments are positively acknowledged by sending a

positive acknowledgement segment based on said data segment length field to said sending network node.

[c102]

102. A system for validating segments on a network as recited in claim 101, wherein said network is selected from the group consisting of a wireless network, a light frequency network, a power line network, and a wired network.

[c103]

103. A system for validating segments on a network as recited in claim 101, wherein said one or more data segments contain forward error correction.

[c104]

104. A system for validating segments on a network as recited in claim 103, wherein said forward error correction is selected from the group consisting of Hamming codes, Convolutional codes, Reed-Solomon codes, Low Density Parity Check Codes, Trellis codes, Block Turbo codes and Walsh codes.

[c105]

105. A system for validating segments on a network as recited in claim 101, wherein said data segment error detection mechanism is selected from the group consisting of a cyclic redundancy check, a checksum, and parity.

[c106]

106. A system for validating segments on a network as recited in claim 101, wherein said positive acknowledgement segment contains an acknowledgement field, a protocol version field, and a cyclic redundancy check field.

[c107]

107. A system for validating segments on a network comprising:

A. a plurality of network nodes forming a network;

B. a time division multiplexed data transfer mechanism which is divided into a one or more time slots, and wherein said one or more time slots are grouped together to form an active channel for transfer of one or more data segments between said plurality of network nodes on said network;

C. wherein said plurality of network nodes further comprises a sending network node and a receiving network node;

D. wherein said sending network node sends said one or more data segments which further comprises a data segment length field which is used to determine when to send an acknowledgement segment and a data segment error detection mechanism;

E. wherein when said one or more data segments are received by said receiving network node and said one or more data segments are positively acknowledged by sending a positive acknowledgement segment based on said data segment length field to said sending network node;

F. wherein said positive acknowledgement segment is received with an error; and

G. wherein said sending network node resends said one or more data segments.

[c108]

108. A system for validating segments on a network as recited in claim 107, wherein said receiving network node drops duplicates of said one or more data segments.

[c109]

109. A system for reliably sending segments on a network comprising:

A. a plurality of network nodes forming a network;

B. wherein said plurality of network nodes further comprises a Bandwidth Master Control Node responsible for bandwidth allocation on said network;

C. a time division multiplexed data transfer mechanism which is divided into a one or more time slots, and wherein said one or more time slots are grouped together to form an active channel by said Bandwidth Master Control Node for transfer of one or more data segments between said plurality of network nodes on said network;

D. wherein said plurality of network nodes further comprises a sending network node and a receiving network node; and

E. wherein said sending network node sends said one or more data segments multiple times based on a segment send value.

[c110]

110. A system for reliably sending segments on a network as recited in claim 109, wherein said network is selected from the group consisting of a wireless network, a light frequency network, a power line network, and a wired network.

[c111]

111. A system for reliably sending segments on a network as recited in claim 109, wherein said one or more data segments are selected from the group consisting of a broadcast data segment, a multi-cast data segment, and a uni-cast data segment.

[c112]

112. A system for reliably receiving a segment on a network comprising:

A. a plurality of network nodes forming a network;

B. wherein said plurality of network nodes further comprises a Bandwidth Master Control Node responsible for bandwidth allocation on said network;

C. a time division multiplexed data transfer mechanism which is divided into a one or more time slots, and wherein said one or more time slots are grouped together to form an active channel by said Bandwidth Master Control Node for transfer of one or more data segments between said plurality of network nodes on said network;

D. wherein said plurality of network nodes further comprises a sending network node and a receiving network node; and

E. wherein said receiving network node receives said one or more segments multiple times.

[c113]

113. A system for reliably receiving a segment on a network as recited in claim 112, wherein said network is selected from the group consisting of a wireless network, a light frequency network, a power line network, and a wired network.

[c114]

114. A system for reliably receiving segments on a network as recited in claim 112, wherein said receiving network node drops duplicates of said one or more data segments.

[c115]

115. A system for reliably receiving a segment on a network as recited in claim 112, wherein said one or more data segments are selected from the group consisting of a broadcast data segment, a multi-cast data segment, and a uni-cast data segment.

[c116]

116. A method for sending variable length segments and error detecting information on a network comprising:

A. selecting a error detection mechanism and an associated preamble;

B. creating a variable length error detection field by running said error detection mechanism over segment data;

C. building a data segment further comprising said segment data and said variable length error detection field ; and

D. sending said preamble which indicates which indicates said error detection mechanism and length of said variable length error detection field and said segment data and said variable length error detection field from a sending network node across a time division multiplexed network.

[c117]

117. A method for sending variable length segments and error detecting information on a network as recited in claim 116, wherein sending said preamble further comprises sending said preamble wherein said network further comprises a network selected from

the group consisting of a wireless network, a light frequency network, a power line network, and a wired network.

[c118]

118. A method for sending variable length segments and error detecting information on a network as recited in claim 116, wherein building said data segment further comprises building said data segment wherein said error detection mechanism is selected from the group consisting of a cyclic redundancy check, a checksum, and parity.

[c119]

119. A method for sending variable length segments and error correcting information on a network as recited in claim 116, wherein selecting said preamble further comprises selecting a preamble that is 40 bits in length.

[c120]

120. A method for sending variable length segments and error correcting information on a network as recited in claim 116, wherein creating said variable length error detection field further comprises building said variable length error detection field which is 10 bits in length.

[c121]

121. A method for sending variable length segments and error correcting information on a network as recited in claim 116, wherein creating said variable length error detection field further comprises building said variable length error detection field which is 30 bits in length.

[c122]

122. A method for sending variable length segments and error correcting information on a network as recited in claim 116, wherein selecting said preamble further comprises selecting said preamble that indicates no error correction field.

[c123]

123. A method for sending variable length segments and error correcting information on a network as recited in claim 116, wherein selecting said preamble further comprises selecting said preamble based on said one or more data segment's length.

[c124]

124. A method for sending variable length segments and error correcting information on a network as recited in claim 116, wherein selecting said preamble further comprises selecting said preamble based a network condition.

[c125]

125. A method for sending variable length segments and error correcting information on a network as recited in claim 124 wherein selecting said preamble further comprises selecting said preamble based on said network condition selected from the group consisting of one or more cyclic redundancy check errors and one or more forward error correction errors.

[c126]

126. A method for sending segments using different forward error correction methods on a network comprising:

A. selecting a forward error correction mechanism and an associated preamble;

B. adding forward error correction to segment data; and

C. sending said preamble which indicates which indicates said forward error correction mechanism and said segment data from a sending network node across a time division multiplexed network.

[c127]

127. A method for sending segments using different forward error correction methods on a network as recited in claim 126, wherein sending said segment data further comprises sending said segment data on said network further comprising a network selected from the group consisting of a wireless network, a light frequency network, a power line network, and a wired network.

[c128]

128. A method for sending segments using different forward error correction methods on a network as recited in claim 126, wherein selecting said forward error correction mechanism further comprises selecting a forward error correction mechanism selected from the group consisting of Hamming codes, Convolutional codes, Reed-Solomon codes, Low Density Parity Check Codes, Trellis codes, Block Turbo codes and Walsh codes.

[c129]

129. A method for sending segments using different forward error correction methods on a network as recited in claim 126, wherein selecting said preamble further comprises selecting said preamble that is 40 bits in length.

[c130]

130. A method for sending segments using different forward error correction methods on a network as recited in claim 126, wherein selecting said forward error correction mechanism further comprises selecting said forward error correction mechanism which uses a 5/16 rate forward error correction code.

[c131]

131. A method for sending segments using different forward error correction methods on a network as recited in claim 126, wherein selecting said preamble further comprises selecting said preamble which indicates no forward error correction.

[c132]

132. A method for sending segments using different forward error correction methods on a network as recited in claim 126, wherein selecting said forward error correction mechanism further comprises selecting forward error correction on said segment data length.

[c133]

133. A method for sending segments using different forward error correction methods on a network as recited in claim 126, wherein selecting said forward error correction mechanism further comprises selecting said forward error correction mechanism based a network condition.

[c134]

134. A method for sending segments using different forward error correction methods on a network as recited in claim 134 wherein selecting said forward error correction mechanism further comprises selecting said forward error correction mechanism based on a network condition selected from the group consisting of one or more cyclic redundancy check errors and one or more forward error correction errors.

[c135]

135. A method for receiving variable length segments and error detecting information on a network comprising:

A. receiving a preamble and a data segment further comprising segment data and a variable length error detection field on a receiving network node on a time division multiplexed network; and

B. determining an error detection mechanism based on said preamble.

[c136]

136. A system for receiving variable length segments and error detecting information on a network as recited in claim 135, wherein receiving said data segment further

comprises receiving said data segment on said network further comprising a network selected from the group consisting of a wireless network, a light frequency network, a power line network, and a wired network.

[c137]

137. A method for receiving variable length segments and error detecting information on a network as recited in claim 135, wherein determining said error detection mechanism further comprises determining said error detection method's length.

[c138]

138. A method for receiving variable length segments and error detecting information on a network as recited in claim 135, wherein determining said error detection mechanism further comprises determining said data segment's length based said preamble.

[c139]

139. A method for receiving variable length segments and error detecting information on a network as recited in claim 135, wherein determining an error detection mechanism further comprises detecting errors in said data segment a error detecting mechanism selected from the group consisting of a cyclic redundancy check, a checksum, and parity.

[c140]

140. A method for receiving variable length segments and error detecting information on a network as recited in claim 135, wherein determining an error detection mechanism further comprises detecting a preamble that is 40 bits in length.

[c141]

141. A method for receiving variable length segments and error detecting information on a network as recited in claim 135, wherein determining an error detection mechanism further comprises detecting an error correcting field that is 10 bits in length.

[c142]

142. A method for receiving variable length segments and error detecting information on a network as recited in claim 135, wherein determining an error detection mechanism further comprises detecting an error correcting field that is 30 bits in length.

[c143]

143. A method for receiving variable length segments and error detecting information on a network as recited in claim 135, wherein determining an error detection

mechanism further comprises detecting a preamble that indicates no error detection field.

[c144]

144. A method for receiving segments using different forward error correction methods on a network comprising:

A. receiving a preamble and segment data encoded with forward error correction on a receiving network node on a time division multiplexed network; and

B. determining a forward error correction mechanism based on said preamble.

[c145]

145. A method for receiving segments using different forward error correction methods on a network as recited in claim 144, wherein receiving said segment data further comprises receiving said segment data on said network further comprising a network selected from the group consisting of a wireless network, a light frequency network, a power line network, and a wired network.

[c146]

146. A method for receiving segments using different forward error correction methods on a network as recited in claim 144, wherein determining said forward error correction mechanism further comprises determining said forward error correction mechanism's length.

[c147]

147. A method for receiving segments using different forward error correction methods on a network as recited in claim 144, wherein determining said forward error correction mechanism further comprises determining said segment data's length based on said preamble.

[c148]

148. A method for receiving segments using different forward error correction methods on a network as recited in claim 144, wherein determining said forward error correction mechanism further comprises correcting errors in said segment data using an error detecting mechanism selected from the group consisting of Hamming codes, Convolutional codes, Reed-Solomon codes, Low Density Parity Check Codes, Trellis codes, Block Turbo codes and Walsh codes.

[c149]

149. A method for receiving segments using different forward error correction methods on a network as recited in claim 144, wherein determining a forward error correction mechanism further comprises detecting a preamble that is 40 bits in length.

[c150]

150. A method for receiving segments using different forward error correction methods on a network as recited in claim 144, wherein determining a forward error correction method further comprises detecting a forward error correction mechanism using a 5/16 rate forward error correction code.

[c151]

151. A method for receiving segments using different forward error correction methods on a network as recited in claim 144, wherein determining a forward error correction mechanism further comprises detecting a preamble that indicates no forward error correction.

[c152]

152. A method for sending converted data on a network comprising:

A. converting data to non-binary widths to fit in a one or more time slots; and

B. sending from a sending network node said data in said time slots on a time division multiplexed network which comprises said one or more time slots wherein said one or more time slots are grouped together to form an active channel.

[c153]

153. A method for sending converted data on a network as recited in claim 152, wherein sending said data further comprises sending said data on said network which further comprises a network is selected from the group consisting of a wireless network, a light frequency network, a power line network, and a wired network.

[c154]

154. A method sending converted data on a network as recited in claim 152, wherein converting said data further comprises converting said data into dectets.

[c155]

155. A method sending converted data on a network as recited in claim 152, wherein converting said data further comprises converting data which width is a power of 2.

[c156]

156. A method for receiving converted data on a network comprising:

A. receiving data on a receiving network node on a time division multiplexed network further comprising one or more time slots which are grouped together to form an active channel; and

B. converting said data for use on said receiving network node.

[c157]

157. A method for receiving converted data on a network as recited in claim 156, wherein receiving said data further comprises receiving said data on said network which further comprises a network selected from the group consisting of a wireless network, a light frequency network, a power line network, and a wired network.

[c158]

158. A method receiving converted data on a network as recited in claim 156, wherein converting said data further comprises converting said data that is 10 bits wide.

[c159]

159. A method receiving converted data on a network as recited in claim 156, wherein converting said data further comprises converting said data to a size that is a power of two.

[c160]

160. A system for sending segments on a network comprising:

A. a plurality of network nodes forming a network;

B. wherein said plurality of network nodes further comprises a Bandwidth Master Control Node responsible for bandwidth allocation on said network;

C. a time division multiplexed data transfer mechanism which is divided into a one or more time slots, and wherein said one or more time slots are grouped together to form an active channel by said Bandwidth Master Control Node for transfer of one or more data segments between said plurality of network nodes on said network;

D. wherein said plurality of network nodes further comprises a sending network node and a receiving network node; and

E. wherein said sending network node breaks up a larger upper layer packet into a one or more data segments for sending across said network.

[c161]

161. A system for sending segments on a network as recited in claim 160, wherein said network is selected from the group consisting of a wireless network, a light frequency network, a power line network, and a wired network.

[c162]

162. A system for sending segments on a network as recited in claim 160, wherein said one or more data segments contains fields selected from the group consisting of a MAC field, a last segment field, a socket field, a segment data length field, a version number, Forward Error Correction field, an encryption field, a segment number field, an ARQ field, a source network number field, a destination network number field, a segment number, a source node number, and a destination node number.

[c163]

163. A system for sending segments on a network as recited in claim 160, wherein said upper layer packet contains a protocol selected from the group consisting of Internet Protocol, User Datagram Protocol, Transmission Control Protocol, Integrated Services Digital Network, Hyper Text Markup Language, Secure Sockets Layer, X.10, Common Application Language, Simple Control Protocol, and LonTalk.

[c164]

164. A system for sending segments on a network as recited in claim 160, wherein said one or more data segments are resent based on data segment errors.

[c165]

165. A system for sending segments on a network as recited in claim 160, wherein said one or more segments are sent in order.

[c166]

166. A system for sending segments across a network as recited in claim 160, wherein said one or more segments are sent out of order.

[c167]

167. A system for sending segments on a network as recited in claim 160, wherein said one or more segments are sent using one of said time slots.

[c168]

168. A system for sending segments on a network as recited in claim 160, wherein said one or more segments are sent using a plurality of time slots.

[c169]

169. A system for receiving segments on a network comprising:

A. a plurality of network nodes forming a network;

B. wherein said plurality of network nodes further comprises a Bandwidth Master Control Node responsible for bandwidth allocation on said network;

C. a time division multiplexed data transfer mechanism which is divided into a one or more time slots, and wherein said one or more time slots are grouped together to form an active channel by said Bandwidth Master Control Node for transfer of one or more data segments between said plurality of network nodes on said network;

D. wherein said plurality of network nodes further comprises a sending network node and a receiving network node; and

E. wherein said receiving network node receives a one or more segments and reassembles them into a an upper layer packet.

[c170]

170. A system for receiving segments on a network as recited in claim 169, wherein said network is selected from the group consisting of a wireless network, a light frequency network, a power line network, and a wired network.

[c171]

171. A system for receiving segments on a network as recited in claim 169, wherein said one or more segments contain fields selected from the group consisting of a MAC field, a last segment field, a socket field, a segment data length field, a version number, a forward error correction field, an encryption field, a segment number field, an ARQ field, a source network number field, a destination network number field, a segment number, a source node number, and a destination node number.

[c172]

172. A system for receiving segments on a network as recited in claim 169, wherein said upper layer packet contains a protocol selected from the group consisting of Internet Protocol, User Datagram Protocol, Transmission Control Protocol, Integrated Services Digital Network, Hyper Text Markup Language, Secure Sockets Layer, X.10, Common Application Language, Simple Control Protocol, and LonTalk.

[c173]

173. A system for receiving segments on a network as recited in claim 169, wherein said one or more segments are dropped if they are duplicate segments.

[c174]

174. A system for receiving segments on a network as recited in claim 169, wherein said one or more segments are reassembled if received in order.

[c175]

175. A system for receiving segments on a network as recited in claim 169, wherein said one or more segments are reassembled if received out of order.

[c176]

176. A system for receiving segments on a network as recited in claim 169, wherein said one or more segments are sent using one of said time slots.

[c177]

177. A system for receiving segments on a network as recited in claim 169, wherein said one or more segments are sent using a plurality of time slots.